TECHNICAL NOTES

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WHY LIVING ORGANISMS

SHOULD NOT BE EXTERMINATED

Why bother?

> What good is a butterfly or black-footed ferret?
> Why all the public concern about "endangered species" and the effort to save animals and plants of no apparent utility to mankind?

An ecologist and practical conservationist gives us 14 reasons.

1. FEW SPECIES of plants or animals have been sufficiently studied that we can state with certainty (a) their place in the biological complex, (b) their relationships with other organisms, or (c) the effect of their elimination on the biological complex and, of course, ultimately on man's welfare.

   Because of our ignorance, we had better go slow in wiping out any species. It might turn out to have been more important to us than we suspected. "True science," commented the French physiologist, Claude Bernard, a century ago, "teaches us to doubt, and in ignorance to refrain."

2. EVERY LIVING species of organism is a complex of genetic material not duplicated by any other organism. The extermination of any species eliminates a unique group of genes that we are completely unable to reproduce.

   Extermination of a species cannot be corrected or reversed. If the extermination proves harmful to human beings, either directly or indirectly, we cannot bring the species back into being.

What has been called the gene pool is being constantly reduced by human beings. So far as we know now, the effects on humankind seem to have been negligible. This, however, is merely a confession of ignorance.

3. STUDY OF RARE or vanishing species may provide us with information we need, or at least can use, to help us understand the world environment in which we live and of which we are an inseparable part.

The biological and ecological reasons underlying the disappearance of a species may, indeed, arm us with information about the human species itself. What factors may lead to the ultimate disappearance from the world of *Homo sapiens*? This is not entirely a theoretical question. Through the geological ages thousands of organisms *have* disappeared--the dinosaur, for example.

What factors have favored persistence of very ancient organisms, and what factors have underlain the elimination of others? And, are any of these factors likely to affect us humans? If so, in what way?

4. FROM A STRICTLY commercial standpoint, the extermination of a species could very easily result in depriving mankind of a product that might be of considerable value.

For example, the fact that a northeastern species of goldenrod already has been exterminated, with its unknown content of rubber, may have deprived us of a source of rubber we might yet need. Or, if we inadvertently or intentionally had exterminated a fungus known as *Penicillium*, we would not now have the drug, penicillin, a product of immense value to human beings. We have no idea, of course, how many other plants there may be that have potential value for humankind.

5. THE REDUCTION in numbers of any species of organism to the vanishing point may indicate a change in our environment that may affect us in ways we cannot predict.

The decline of the black-footed ferret and burrowing owl indicates the disappearance of prairie dogs on which both these animals are dependent. The gradual elimination or disappearance of the prairie dog, in turn, indicates changes in the grasslands of this country. Most of these changes have been brought about as we have replaced natural grasslands and their denizens with pastures for livestock.

It is quite conceivable that in the future we might want to handle our cattle and sheep (or other grazing animals that we might wish to use) in other ways than we do now. In this event, we might wish to return our grasslands to their former "natural" state.

6. WHILE THERE IS little doubt that various species of plants and animals are "on the way out," biologically speaking, and that their elimination would have minor effects on the already adjusting biological complex, we cannot presently distinguish which species these are.

Some of the unique species of pupfishes are probably in this category; no conceivable effects upon world biology or ecology can be predicted if these fishes were to be exterminated. In our ignorance, we might suppose that other species of organisms also would not be missed, but some may surprise us. Better be safe than sorry.

7. WHEN A SPECIES becomes extinct, the ecological niche it formerly occupied sooner or later will be filled by another organism. We generally are not able to predict what creature might be involved nor what the effect of its invasion would be. Whether the new form might turn out to be useful or deleterious in the ecosystem, more especially in relation to man's welfare, can only be a matter of conjecture.

Many ecological niches may exist that we are unaware of, and the unexpected movement of an exotic species into any one of them might come as a surprise. Nutria in the swamps of Louisiana appear to be an example of such an ecological change. So far, this seems to be an invasion of little or no consequence to man, but we may not yet know the whole story. We do not even know whether the niche involved was created by man or by natural forces.

8. WE HAVE DEVELOPED in many places ecological niches that were not in existence before. The unexpected filling of these niches by certain species has often been a source of annoyance or of serious trouble to us.

The intrusion of the English sparrow in the United States is a case in point. Our use of horses made it possible for this bird to succeed at the time, feeding, as it did, on the grain in horse droppings. With the replacement of horses by the gasoline engine, the population of sparrows diminished. The sparrows also invaded with fair success niches occupied by some native birds. All these changes undoubtedly were affected by many other factors not noted here.

9. THE SUBSTITUTION of simple ecosystems, designed by man, for much more complex natural systems, commonly accompanied by reduction or extermination of one or a number of species, can set the stage for later, usually unpredictable, changes. Such changes may ultimately cause difficulty to man.

An example is the introduction of cotton culture into the Southeast, with considerable reduction in populations of plants and animals formerly composing a much more complex ecosystem. The later nearly disastrous invasion of the cotton culture system by the boll weevil is a case in point.

Not all such changes are "bad," as witness the introduction of the Chinese pheasant into the corn-hog agriculture of the Corn Belt. No one predicted the success of the pheasant in relation to the corn culture. Both the agricultural system and the introduction of an exotic bird were undertaken pragmatically, without ecological foreknowledge. Numerous additional examples could be cited.

10. THE REPLACEMENT of natural biological processes or communities by man-made processes requires that we *maintain* our processes in order to continue the effects we want. This imposes a workload on us that increases to the degree that we change things.

Oftentimes, with relatively slight or no adjustments, we might have achieved the effects we sought without the continuing labor of manipulation by relying instead on naturally occurring biological processes.

For example, on the Great Plains we could produce excellent meat from buffalo instead of from introduced European cattle. If we did this, we would not be confronted with the very sizeable and costly task of raising cattle. Instead, we could reap a harvest from the natural biological communities involving buffalo, wild grasses, prairie dogs, and related animals and plants that are believed to have sustained at one time 60 to 80 million animals (not counting elk, antelope, and deer) without any effort on our part whatsoever. This compares with 45 million head of cattle and 10 million sheep presently raised in the Great Plains area.

11. FROM A MORAL or ethical standpoint, the case can be made that human beings do not have the "right" to destroy another living organism.

We did not make the world in which we live. We are a part of it; we have evolved in it; we probably had better cooperate with our environment rather than destroy it in whole or in major part in the attempt to recreate or develop a new one--at least, until such time as we are fully aware of what we are really doing.

A strong point has been made by Dr. Jean Mayer, professor of nutrition at Harvard University, for "the rights of animals, or at least of species, to survival, to sufficient space to feed and breed unhampered, and to freedom from new threats from an encroaching technology."

In the 1971 W. O. Atwater Memorial Lecture at the Second National Biological Congress at Miami Beach, Florida, he said, "We always fall short of agreeing on a bill of rights for animals--an equivalent of 'life, liberty, and the pursuit of happiness' for at least some representatives of each species."

12. MAN IS ABLE to live on earth because the environment in which we have evolved, or, so to speak, whence we came, is still favorable to us. Factors that trigger changes in that environment may sometimes act subtly and unexpectedly. Quite conceivably, the extinction of a plant or animal species could act as such a triggering factor, setting in motion a sequence or flow of events not necessarily favorable to mankind.

13. MANY LARGER FORMS, familiar as "rare" or "endangered" or "vanishing" species of animals or plants, are of great interest to a great many people, although not necessarily to all.

There are plenty of people who would like very much to see a live passenger pigeon, or a great auk, or a Carolina parakeet, or a chestnut tree, or any of dozens of other forms of life that have already been exterminated. They were part of the world in which we live, and some or perhaps all of them would be fascinating to see if they were still present.

Associated with this idea is the knowledge that many other forms of life are in danger of disappearing. Almost no one will ever see them again.

14. ALTHOUGH THE CHANGES brought about by man on the earth have been great, one important part of man's relationship with his environment has not changed--that is, the nature of man himself.

If, as the evidence now stands, humankind is a product of the earth environment through billions of years, then what effects are to be expected when man moves fully into his own newly made environment without complementary changes in his own nature that may be needed to adapt to the new conditions?

There is evidence that bacterial and fungal colonies can degrade their own environment sufficiently to destroy themselves. But we have no precedent for the development of a new environment by an organism in which the organism also changes to keep pace and thus survives. The known facts argue strongly against the human species risking its survival on such an ecological experiment.